Patent claims

1. A method for estimating the lighting quality of vehicle headlights particularly automobile headlights, where for each tested headlamp the distribution of illumination on a screen or the luminous intensity distribution in a solid angle of emitted light beam is measured and the obtained results are compared with the required values characterised that the obtained illumination or luminance distribution for each tested headlamp is first transformed, by the known geometric methods, to the real distribution of vertical illumination on the road surface and then all the such obtained light distributions for all headlamps of the tested set are summarised giving a final distribution of vertical illumination E_d , and that in the same way the real distribution of vertical illumination on the surface parallel to the road, lying on the eye-level of the glared drivers, is calculated and then all the such obtained illumination distributions for each headlamp of the tested set are summarised giving a final distribution of vertical illumination E_o , and that from the such obtained results some measure values of lighting quality are calculated, which are the numerical values M_k for illumination of the road and the numerical values N_l for the eyes of glared drivers, wherein the said calculations are made for some numbers k of sectors S_k established for the road surface and their surrounding, and for some numbers l of sectors S_l established for the surface at the eye-level of the glared drivers.

2. A method according to claim 1 characterised that the numerical values M_k are calculated from the following mathematical formula

$$M_k = \frac{\int_{S_k} E_{rd} \cdot dS_k}{a \cdot E_a S_k}$$

where E_{rd} is the illumination value used for the calculation, on the conditions that $E_{rd} = E_d$ when $E_d \geq E_{pr}$ or alternatively $E_{rd} = 0$ when $E_d < E_{pr}$ where E_{pr} is the threshold illumination in which the human eye can see anything, E_a is the illumination on the surface of the driver`s eye caused by the light of the tested headlamps and responsible for the sight adaptation level of driver`s eye, a is a constant number, reflecting the proportion between the illumination on the surface of the eye and illumination close to the road surface, dS_k is a differential of the area of tested sector k and, S_k is the whole area of the sector k, while the numerical values N_l are calculated according to the following mathematical formula

$$N_l = \frac{\int_{S_l} (E_{oe} \cdot \cos\alpha - E_{op}) \cdot dS_l}{E_{op} S_l}$$

where E_{oe} is the value of illumination used for the calculation, on the conditions that $E_{oe} = E_o$ when $E_o \cdot \cos\alpha \geq E_{op}$ or alternatively $E_{oe} = E_{op}$ when $E_o \cdot \cos\alpha < E_{op}$ where α is an angle between the sight line of the driver and the light beam causing the glare, E_{op} is the threshold glare illumination on the surface of the eye, dS_l is a differential of the area of tested sector l and, S_l is the whole area of the sector l.

3. A method according to claim 2 characterised that the value of parameter E_a is calculated from the following mathematical formula

$$E_a = \int_{\omega} L_d \cdot \cos\theta \cdot d\omega$$

or alternatively from the another mathematical formula

$$E_a = b \cdot \frac{\int_{S_e} E_{da} \cdot dS_e}{S_e}$$

wherein L_d is the luminance of the road observed by the driver and caused by the tested headlamps, ω is a solid angle with its top in the driver's eye where the illuminating surface of the road exists or a part of this angle in which there is the greatest luminance of the road responsible for the sight adaptation level of the human eye, b is a constant number which reflects the proportion between the illumination on the surface of the road and the illumination on the surface of the eye, θ is an angle between the line perpendicular to the surface of the driver's eye and the incident light beam, E_{da} is the illumination on the surface of the road which causes the luminance responsible for the sight adaptation level of the driver's eyes, S_e is the area of a plane which is perpendicular to the direction of the driver's sight line and through which the light beams reflected from the road surface incident to the eyes and, dS_e is a differential of the area S_e.

4. A method according to claim 3 characterised that all the values of illumination and luminance used for the calculations are replaced by proportional non-linear functions.

5. A method according to claim 4 characterised that one of the non-linear functions is the logarithmic function.

6. A method according to claim 5 characterised that all the above mathematical calculations are made by means of computerised numerical methods.